from Australia, where Miss Hussey and others collected for him. The herbarium of the late Mr. Bracebridge Wilson, which was bought by the British Museum in 1896, had been referred to Prof. Agardh, and some of his notes are found in Mr. Wilson's handwriting copied on the sheets.

Of the kindness of the late professor it is possible to speak from personal experience. He was always ready to help and advise any student of algæ; he would examine a plant sent to him and endeavour to identify it, and, when the circumstances warranted the risk, he would send his own valuable type-specimens for examination. Never did Prof. Agardh fail to give of his best, though from his position in the world of phycology requests must sometimes have been numerous, and leisure uncommon. So late as December of last year it was my privilege to receive from him on loan a type-specimen of one of his species of Siphoneæ, and for the first time there was in his letter a strong vein of anxiety concerning the alga, and an urgent request that it might be speedily and carefully returned. The whole letter showed most markedly the advance of age, and the evident relief when the alga reached him safely on its return was almost touching. Quite shortly afterwards came the news of his death on January 17 of this year.

His knowledge of English was excellent, and he wrote it well and idiomatically.

His herbarium was given by him some years ago to Lund University, the home of his own work and of his father before him.

Medals and honours came to him from all sides. He was member of the Vetenskaps Academy, honorary member ot the Göteborg Scientific and Literary Society, as well as of the Scientific Society of Upsala and the Agricultural Academy and Physiographical Society in Lund. In 1862 he was appointed to confer the degree of Ph D. at Lund, in 1879, at the jubilee of the Copenhagen University, he received the honorary title of doctor of medicine, and in 1883 he became a "jubeldoktor" of philosophy. In 1893 he was decorated with the Grand Cross of the Nordstjern Order, in 1886 the Vetenskaps Academy presented him with the Letterstedt prize for original work, and in 1897 he received the gold medal of the Linnean Society. He was also knight of the Prussian Order Pour le Mérite.

As delegate for the University of Lund he attended the two last sessions of the Ecclesiastical Council, and after the change in the representation he was member for the town of Lund in the second Chamber from 1867-1869 and from 1870-1872. He was also member of the Mint Committee of 1872.

He married, in 1848, Margareta Helena Sofia Meck, who survives him; and he leaves two sons, one of whom continues the family tradition of being attached to the University of Lund. E. S. B.

PROF. ELISHA GRAY.

IT is with great regret that we learn of the death of Prof. Elisha Gray on January 21. Prof. Gray was born at Barnesville, Ohio, in 1835; he was apprenticed to a carpenter, and during the time of his apprenticeship he studied physical science. At the age of twenty-one he went to Oberlin College, where he worked for five years, and at which he afterwards became professor. Prof. Gray first turned his attention to electrical invention when at the age of about thirty; he then invented a self-adjusting telegraphic relay. This was soon followed by other inventions of telegraphic apparatus. In all he took out about fifty patents, mostly dealing with telegraphy and telephony; one of the latest of these, and one of the best known, was the telautograph, a telegraphic apparatus for transmitting handwriting to a distance. At the time of his death he was engaged in carrying out experiments on a method of marine signalling with electric bells by which the sounds could be transmitted several miles through the water. In the course of these experiments, we understand from an American contemporary, he caught a chill which caused his sudden death.

Prof. Gray's name will be perhaps best known and remembered in connection with the invention of the telephone. On February 14, 1876, he lodged a caveat with the American patent office for the invention of a telephone. On the same day, but a little later, Graham Bell lodged a caveat for his similar invention. Bell was, however, the first to perfect his instrument, and in consequence Gray yielded to him in the dispute as to priority which arose, and the matter was compromised by the purchase of both patents by the same company. In later years, in the course of legal cases which arose in connection with the Bell patents, disclosures were made by which Gray was led to believe that his caveat had been betrayed to Bell by one of the patent examiners. Whether this actually was true or not seems to be uncertain, but in any case Gray firmly believed in its truth, and his later years are said to have been embittered by the thought that he had been cheated out of the money and credit he deserved. In 1878 his work in connection with the telephone was recognised at the Paris Exhibition, and he was decorated with the Legion of Honour. In 1893 he was Chairman of the International Congress of Electricians at the World's Fair at Chicago. He was the author of a popular book on electricity, and also of several papers communicated to scientific societies.

THE INDIAN ENGINEERING COLLEGE, COOPERS HILL.

A DEPUTATION waited on Lord George Hamilton on Tuesday last with respect to the recent dismissals from Coopers Hill College, and in support of the following memorial, with 374 signatures attached, including the names of the principal leaders of science in the country. The deputation was introduced by Lord Kelvin, and there were present Lord Lister, Lord Rayleigh, Sir H. Roscoe, Prof. Armstrong, and Dr. G. J. Stoney, who spoke in relation to the question; Sir F. Bramwell, Sir F. Abel, Sir Norman Lockyer, Sir William Crookes, Prof. Carey Foster, Prof. Meldola, Prof. Le Neve Foster, Prof. Everett, Prof. Perry, Prof. Poynting, Dr. G. Johnston, and many others.

Memorial to the Right Honourable the Secretary of State for India.

The correspondence regarding Coopers Hill College which has been published in the *Times* of January 3, 1901, which includes Sir Horace Walpole's letter to Colonel Ottley of December 14, 1900, and Colonel Ottley's letter of December 17, 1900, has caused a painful shock to those engaged in higher education throughout the United Kingdom, and to all who are interested in the training of engineers.

This correspondence relates to the sudden and arbitrary dismissal of able and distinguished scientific teachers, who have been doing duty in the College for periods of from nine to thirty years, and the value of whose past services is at the same time officially recognised.

Such arbitrary dismissal is likely to affect adversely the cause of scientific teaching in the United Kingdom. It cannot fail to injure the future of the College. During the correspondence which has ensued it has become apparent that the teaching staff have no voice in the educational policy of the College, and are not consulted when any change in the curriculum is contemplated. We wish to draw the attention of the Secretary of State to this unsatisfactory state of affairs, which must militate against the success of the College as an educational centre.

The sudden dismissal is action of a kind which we were not prepared to expect in any institution under the control of the British Government; and we think that the seven members of

the staff who are required to retire at three months' notice are justified in asking for the inquiry into the working of the College, for which they have petitioned in their memorial of Dec. 27, 1900.

We therefore desire to express our hope that the Secretary of State for India will see his way to grant their request, and to suspend proceedings until an adequate inquiry by competent persons shall have been held.

Lord Kelvin, as reported in the *Times*, said he represented 374 signatures with respect to the seven dismissals from the Engineering College. He had received letters of apology from Sir Batty Tuke, who expressed the conviction that a great injustice had been done; from Sir Richard Jebb, who expressed the opinion that the dismissals were harsh and derogatory to science and deterrent to good men; from Col. Milward, from Prof. Oliver Lodge, who said the professors had been treated like pawns; Sir Douglas Fox wrote as an ex-governor of the college who had received no notice of this proposed "drastic change." Sir Douglas Fox said that certain changes had been suggested to the board of visitors, and among these the supersession of two out of the staff; but he was astonished to find seven men dismissed.

Lord George Hamilton said that all who were present signed the report. Sir D. Fox was wrong.

Lord Kelvin said he had read in the *Standard* that the board of visitors were unanimous. But the letter of November 2—the origin of the change—was founded on recommendations of the board of visitors at that date, and those recommendations did not propose that seven gentlemen should be dismissed. It was clear that the general public looked upon the board of visitors as the governing body, and in so doing were resting on a broken reed. The board appeared to have had little to do with the matter. The object of the memorial was threefold—(1) To protest earnestly in the public interest against the proposal for the sudden and arbitrary dismissal of seven out of fourteen of the staff of the college; (2) to call attention to the continued prosperity of the college and the need for reform in the curriculum; (3) to express a hope that the Secretary of State would countermand these changes, until adequate inquiry was made and they were shown to be necessary for the good of the college. Sir Horace Walpole rested the case on economy. Now the cost of the whole scientific staff was 7970*l.*, and the fees were 22,143*l.*, or about 36 per cent. of the receipts for tuition. When the number of students did not fall below 121 there was a surplus; and thus retrenchment could hardly be the real reason. The proposed change would effect a saving of 2750*l.*; and certainly economy at the expense of efficiency was a great mistake. The dismissal was sprung upon the threatened persons, and was certainly not creditable. One of them—an old pupil of his own—described it as a blow in the dark, and said he could not understand it. It might, his correspondent said, have been desirable to reduce the number, but it was inconceivable that the abolition of the professorships of chemistry and of physics and of the posts of demonstrator of physics and of instructor of physics should have been recommended by the board of visitors. The chemistry for the future, it appeared, was only to be such as should enable engineers to understand the statements of results of professed chemists. There was to be no electricity or magnetism. Did the authors of this scheme know anything of the requirements of engineering? Electrical engineering was still on the list. That was an applied science; and thus we had a British Government college, teaching the application but not the fundamental principles of a science. Was that worthy of this country? The public might fairly expect that the present staff would, at all events, continue to the end of the present year, as entering students could hardly be deprived of adequate teaching of the full curriculum of subjects. The Secretary of State himself had borne testimony to the excellence of the college—even so recently as last year. There might have been some falling off, but a high standard was kept up. There had, no doubt, been some complaints, and from India the telegraphy course was found fault with. But that course was not intended to be exhaustive, but was to be supplemented by other members of the staff. But there was no complaint about any candidate who entered the Public Works Department of India. In the telegraph department two gentlemen were admitted into the public service whom Coopers Hill refused to certify. He earnestly hoped the noble lord would let the existing prospectus be that of 1900, and that Colonel Ottley and his staff would contrive to work together and remove causes of mutual friction. Discipline, law and order were doubtless necessary, but they might be harshly enforced; and of these gentlemen there was no recorded complaint.

Lord Lister said there were two questions; one the manner of the dismissal, and the other the expediency of the changes in the curriculum. On the first he needed to add nothing to what Lord Kelvin had said. Such a step was a great discouragement to those who wished to follow a scientific career; such appointments were rare, and a man's lifework might be abruptly stopped by such treatment as was being accorded. In his own profession he had to lament the tendency of examining bodies to abolish or minimise scientific training.

Lord Rayleigh said that unless such educational posts under the Crown were reasonably secured, there would be great difficulty in getting good men. Of the men to be dismissed he had personal knowledge of some, and Prof. McLeod was a man of world-wide repute among chemists.

Sir Henry Roscoe was sure that Lord George Hamilton had acted for the best: but they were convinced that he was mistaken. The dismissal of these men without notice was subversive of the interests of science and prejudicial to the college itself.

Prof. H. E. Armstrong said that these gentlemen's colleagues felt the action of the Government to be a positive affront. None of the signatories to the memorial, he thought, objected to a careful revision of the subjects and methods of the college; but that was another matter. If the new teaching of chemistry was to be such as had been described, it would be better to drop the subject altogether. If our engineers of India had been competent chemists they would have been able to advise the indigo planters and prevent the transfer of a trade of three millions to German planters.

Dr. G. J. Stoney said the letter of appointment to Coopers Hill was that it was tenable so long as the work was satisfactory; but with the proviso of three months' notice, without cause assigned on either side. The substantive clause and the proviso ought to have been read together, and the proviso ought not to render the words of the clause nugatory. The proviso was only to prescribe the method of dismissal if the work was not efficiently done. The interpretation of the proviso acted upon by the authorities virtually overrode the words of the substantive clause.

Lord George Hamilton, in replying to the deputation, is reported by the *Standard* to have said that as soon as he received a memorial to which were attached such distinguished signatures he felt it his duty to take the first opportunity of meeting the gentlemen who had expressed such interest in the future well-being of Coopers Hill College. He was under the impression when he read the memorial that it was based entirely on certain suppositions, and the more he listened to the speeches the clearer was it to him that the great mass of the signatories had, under some misapprehension, attached their names to the memorial. He had the honour of seeing a number of gentlemen whose names were household words all over the world as investigators in original science, and who had made discoveries of the utmost benefit to mankind. He ventured to point out that the memorial as drawn up would reverse the process by which they had achieved fame. That fame had been attained by an investigation into the phenomena of facts, and this memorial asked for an inquiry, but every speaker had with the utmost confidence pronounced an opinion upon the subjects on which he asked for investigation. He did not in the least find fault with the signatories, who had been misled, nor could he attach any blame to himself. The Coopers Hill Staff had adopted a very unusual and inconvenient course. They had a perfect right to protest against any action which they thought prejudicial to their personal interest, and to press the India Office to reconsider the question, but they sent a memorial to himself, and before it was possible to consider it they at once embarked in a newspaper agitation, with letters written by the gentlemen themselves or by their friends. He wished to explain very fully the reasons for the action the India Office had taken, and then he would ask the deputation whether, when the facts had been brought before them, the India Office could have acted otherwise than they had done. He then gave a short history of the foundation of Coopers Hill. From the outset the College had been a financial failure, and it had placed a considerable burden upon the revenues of India, and until quite recently there was a considerable deficit

in the revenues of the College. In 1895, Mr. Fowler, his predecessor, appointed a Committee to inquire into the financial position of Coopers Hill, which unanimously reported that the teaching staff of Cooper's Hill was out of all proportion to the number of students they had to teach, but there was then no inquiry made into the efficiency of the education given. Shortly after he became Secretary of State for India he came in contact with various members of the board of visitors, and he was warned that the College was very far from being in a satisfactory state, either as regards teaching or discipline, and that the best thing would be to abolish the College altogether. He declined to do that, and thought they ought to try to improve the College before attempting to abolish it. Nine months after Colonel Ottley became president of the College he presented a report in accordance with the instructions of the India Office. The memorial asked for an inquiry by competent persons. The inference rather was that whatever inquiry had been made was inadequate and had not been made by competent persons. His lordship quoted the names of the gentlemen forming the board of visitors, and mentioned their various qualifications, adding that there had not been a change made in the College that had not had the unanimous approval of the gentlemen to whom he had referred. Those gentlemen had gone through every proposition made to them, and it seemed to him a little unreasonable on the part of Sir Douglas Fox to try to convey to the public what passed at a meeting at which he was not present. The report which Colonel Ottley made showed a very unsatisfactory state of affairs at the College, and he (Lord George) was sorry to have to publish it. It was self-evident that the state of things was such that they could not tolerate. The deputation had come to him because they believed that one-half of the teaching staff had been summarily dismissed. He was afraid, therefore, he must detain them by going through each particular case. The reasons were so self-evident in each particular instance that he thought they would all agree that the Council had no option but to do what they had done. His lordship then gave details of the proposed scheme of retrenchment, mentioning the names of Mr. Reilly, Mr. Hurst and Prof. McLeod, and the gratuities and pension granted them. He now came to the four displacements, which were the result of changes that were to take place in the teaching at Coopers Hill. He had no doubt it would surprise gentlemen to learn that though electrical engineering had made enormous progress in recent years, it was not an obligatory subject at the College, and was hardly taught at all. They proposed to make it a compulsory subject, and to bring in a gentleman of high attainments from outside, who would be assisted by the very best lecturers that could be obtained. These changes necessitated the retirement of Mr. Stocker and Mr. Shields, who would be compensated. The two cases which were left were probably the most important of any of the changes they proposed. Everybody who had looked into the teaching at the College was of opinion that the right course was to place the whole course of engineering in the hands of one professor, with a competent assistant, and that being so, they were bound to appoint to the post the most competent professor for the position. That gentleman was Dr. A. W. Brightmore, and his appointment necessitated the retirement of Mr. Hearson and Mr. Heath, to whom pensions have been granted. The upshot of the whole matter would be this—there would be an increase in the hours of work in class and lecture from twenty-six to thirty-two, that the standard of the entrance examination would be raised, electricity as a subject would be thoroughly taught, outside examiners would be appointed, and the whole course at Coopers Hill would be brought, as far as practicable, into accord with modern engineering requirements. He had stated exactly the reasons and courses which had induced them to take the action they had done, and he thought they would see it was an impossibility for them to reopen the subject, or have a fresh inquiry. The noble lord went on to say: I often wonder how it comes to pass that when we spend so much money on our educational system, which in every branch is the most expensive in Europe, that we attain such unsatisfactory results. In every newspaper devoted to education in recent years there have been complaints by parents and others, pointing out the necessity of improvements if we are to hold our own. What is the main obstacle? What is the great impediment to all educational reform? I pass to a subject on which we shall all be in harmony—the system of education prevalent in our public schools. I read the other day an instructing report drawn up by a gentleman who had thoroughly investigated the system of teaching in force at the preparatory schools for the great public schools, and this was his comment:—"That in these preparatory schools the curriculum in force for boys of from twelve to thirteen is as follows: Hours per week: Eleven for Latin, five for Greek, three-quarters of an hour for English, two for history and geography, three for French, and six for mathematics," and he goes on to say that "this course of study is obviously faulty, though the fault is not with the preparatory schoolmasters, who are quite alive to the need of reform, and prepared to admit it when the public schools, which in this country depend upon the Universities, will allow them to do it." Why will not the Universities and public schools allow this ancient and antiquated system to be changed? Because the personal interests of those who teach classics stand in the way, and if you come to me, then, in the interests of scientific teaching for the future, are you not rather emphasising and accentuating the difficulty that must always face educational reform if the personal interests of those who teach are to be predominant over every other consideration? And there is another consideration which I think will come home to you—that no college is worth maintaining unless discipline and subordination can be infused into the students. I think it is very unfortunate that these gentlemen began to agitate in the way they did. The result has been that the students of the Coopers Hill College have begun to write to the newspapers, and I know of one very improper letter that was repudiated by the older students. I am most anxious to treat all the gentlemen at Coopers Hill College with the utmost consideration, but I am quite determined—and in that I express the unanimous opinion of the Council—that, so long as we are responsible for Coopers Hill College, we are determined to maintain discipline and subordination there. I should be exceedingly sorry if you went away with the impression that we had been harsh or discourteous or arbitrary towards the gentlemen who are to be dismissed; but we entered into a contract which necessitated our giving them notice if we wanted to dispense with their services. We are compelled to give them notice, and I do not see how we could have acted otherwise. I hope always to treat all gentlemen of scientific attainments with the utmost consideration, and to pay all attention to their wants; but it must be self-evident to everybody who dissociates himself from the subject under discussion, that the Government cannot for a moment admit that any gentleman who happens to be engaged in scientific teaching is to have such vested interest in the permanence of the post he holds that he is to hold it regardless of the terms or conditions of the engagement into which he has entered. Such a position is an impossible one, and, therefore, I cannot hold out to you any hope of going back on the decision which has been conveyed to these gentlemen. What we did we did deliberately, and after the fullest examination, and after we had availed ourselves of the advice of the best authorities at our disposal. Any suggestions that may be made by the gentlemen before me with regard to improving the curriculum and time-table at Coopers Hill or enabling the president of the College and the board of visitors to establish harmonious relations with the teaching staff will receive our most careful consideration. But we cannot undo what we have done, and, therefore, though the statements I have made will not be satisfactory to you all, I cannot help thanking you for the interest you have taken in Coopers Hill College, and I hope that if ever it becomes again the subject of discussion between us, I shall be able to show that the changes which we have made will result in improving the utility of the College and bringing it fully up to modern requirements.

Lord Kelvin thanked the noble lord for his courtesy in receiving the deputation, but expressed disappointment at the nature of his reply.

The deputation then withdrew.

NOTES.

PROF. J. A. EWING, F.R.S., has been elected a member of the Athenæum Club under the provisions of the rule which permits of the election of persons "of distinguished eminence in science, literature, the arts or for public services."